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Graft hybrids.—WINKLER³³ has published a further account of his experiments with graft hybrids of *Solanum nigrum* and *S. lycopersicum*. In all, thirteen graft hybrids have appeared, belonging to five different types, which are named *S. tubingense*, *S. Darwinianum*, *S. Gaertnerianum*, *S. proteus*, and *S. Koelreuterianum*. Of these forms the first three resemble most *S. nigrum*, and the last two resemble the tomato, *S. proteus* being very variable in leaf shape and having leaves similar to *S. Darwinianum*. *S. Gaertnerianum*, like many sexual hybrids, often has sterile anthers. *S. Darwinianum* and *S. Koelreuterianum* are very unlike in their vegetative organs, but similar in their flower characters. *S. proteus* produces reversions to the tomato, which it most resembles, while *S. tubingense* reverts to the nightshade, its nearest parent.

Some viable seeds are produced by the graft hybrids, but the percentage of germination is very small. In *S. tubingense* the length of time required for ripening the fruit is short, like that of the nightshade, while the maturing time for the seeds is intermediate, and hence the ripened fruit contains immature seeds.

The chimeras described in WINKLER'S previous papers also recur, and some others are of peculiar character; e. g., one chimera was *S. lycopersicum* on one side and *S. tubingense* on the other, and another was composed of the two graft hybrid forms, *S. tubingense* and *S. proteus*. In *S. nigro-tubingense* one flower had two white petals and three yellow. *S. Darwinianum* similarly originated from a chimera which was partly *S. nigrum* and partly *S. Darwinianum*, and a pure shoot of the latter was obtained only after four decapitations of this branch. *S. Gaertnerianum* appeared five times on different grafts, in some cases as an independent shoot and in others from a chimera.

The forms are all held to be true graft hybrids and not mutations, because they are intermediate between the parents. WINKLER thinks that graft hybrids differ from sexual hybrids in their marked pleiotypy, but it is too early to say what the cause of this may be.—R. R. GATES.

Heredity in the pea.—Two papers by DARBISHIRE³⁴ deal with heredity in the pea. The first is a very interesting analysis of the types of starch grain in round and wrinkled hybrid peas. It is to be hoped that this valuable paper will lead to many other studies of a similar sort, because very little attention has been paid to the ontogenetic development of Mendelian characters. GREGORY³⁵ had previously shown that round and wrinkled peas possess different types of starch

³³ WINKLER, HANS, Weitere Mitteilungen über Pfropfbastarde. Zeitschr. Bot. 1:315-345. pl. 1. figs. 4. 1909.

³⁴ DARBISHIRE, A. D., On the result of crossing round with wrinkled peas, with especial reference to their starch grains. Proc. Roy. Soc. London B 80:122-135. figs. 6. tables 8. 1908.

———, An experimental estimation of the theory of ancestral contributions in heredity. Proc. Roy. Soc. London B 81:61-79. tables 8. 1909.

³⁵ GREGORY, R. P., The seed characters of *Pisum sativum*. New Phytol. 2:226-228. 1903.

grains. In the round pea are large potato-shaped grains (*p* grains), while the wrinkled pea has compound grains (*c* grains), averaging six parts to a grain. In addition, both types possess a few very small circular grains and in the wrinkled pea are found occasional *p* grains, though these are very rare. In the hybrid F_1 the starch grains are perfectly intermediate between those of the parents, although the character roundness is dominant. The majority of the grains in F_1 are large and round; some, however, are compound, averaging three parts to a grain. Heterozygotes (DR) in the F_2 were of a similar sort, but extracted wrinkled peas in F_2 showed an occasional *p* grain. DARBISHIRE concludes that round differ from wrinkled peas in four pairs of characters: (1) the shape of the pea, (2) its absorptive capacity for water, (3) the shape of the starch grain, and (4) the constitution of the starch grain, i. e., whether single or compound.

In a more recent paper the author tests the theory of ancestral contributions as applied to Mendelian heredity. Yellow and green peas obtained from India, Canada, China, Russia, and other sources gave similar results. The recessive character appearing in F_2 was shown to behave as though it was as pure as that borne by a pure race. It was concluded that "there is nothing like ancestral contributions within the limits of a single unit character," and that in such cases in predicting the results of a cross, "the somatic characters not only of the parents and of the ancestors of the individuals mated, but of the individuals themselves, may be left out of account," expectation being based on the theory of the contents of the germ cells.—R. R. GATES.

Diversity in cotton.—Several bulletins by COOK and his associates in the Department of Agriculture³⁶ are not only of great commercial value in directing the activities of cotton growers, but are also of considerable interest as studies in variability and its causes, and the results of crossing. Without attempting to mention all the topics considered, one or two of them may be referred to as of special interest. The diversity found in Egyptian cotton introduced into Arizona is considered to be of four kinds: (1) diversity due to hybridization, (2) diversity due to incomplete acclimatization, (3) diversity due directly to differences in the physical environment, and (4) diversity in different parts of the same plant. Slight differences in the external conditions have large effects in the productivity of individuals by determining the production of sterile or fertile branches.

³⁶ COOK, O. F., Reappearance of a primitive character in cotton hybrids. Bureau Pl. Ind., Circ. 18. pp. 11. 1908.

———, The superiority of line breeding over narrow breeding. Bureau Pl. Ind., Bull. 146. pp. 45. 1909.

———, Suppressed and intensified characters in cotton hybrids. Bureau Pl. Ind., Bull. 147. pp. 27. 1909.

COOK, O. F., McLACHLAN, A., AND MEADE, R. M., A study of diversity in Egyptian cotton. Bureau Pl. Ind., Bull. 156. pp. 60. *pls. 6*. 1909.

COOK, O. F., Local adjustment of cotton varieties. Bureau Pl. Ind., Bull. 159. pp. 75. 1909.